

[0133] (Results of Evaluation)

[0134] The transparent conductive films of Examples 1 and 2 and Comparative Examples 1 and 2 were evaluated in terms of total light transmittance (%), haze value, surface roughness (ten-point mean roughness (Rz) and maximum height (Rmax)), distinctness of image, anti-glaring properties, pencil hardness, slipperiness at ITO film deposition, and sharpness of image when visually observed. The evaluation methods employed are as follows.

[0135] The total light transmittance (%) and haze value were measured by a haze meter ("Direct-Reading Haze Meter" manufactured by Toyo Seiki Co., Ltd., Japan).

[0136] The surface roughness (ten-point mean roughness (Rz) and maximum height (Rmax)) was determined by using a surface roughness tester ("Surfcoder SE-30K" manufactured by Kosaka Laboratory, Ltd., Japan).

[0137] The distinctness of image was evaluated by a specified measuring method (Method for Measuring the Distinctness of Image according to JIS K7105, 6.6), where the total value of the measured values obtained by using four different optical combs (optical comb width: 0.25 mm, 0.5 mm, 1 mm and 2 mm) was taken as the distinctness of image. When this value obtained is higher, the distinctness of image is better. An image clarity tester ("ICP-IPD" manufactured by Suga Test Instrument Co., Ltd., Japan) was used for the measurement.

[0138] The anti-glaring property was evaluated by adhering the transparent conductive film to the front surface of a color filter for a liquid crystal display (LCD), photographing the surface of the transparent conductive film by using an image clarity measuring device ("MJ-RTS" manufactured by Mizojiri Optical Co., Ltd., Japan), and obtaining the standard deviation of the brightness on the screen. The value of this standard deviation obtained was taken as a measure of the anti-glaring property. When this value is smaller, the degree of glaring is lower.

[0139] The pencil hardness test was conducted by the use of a pencil hardness tester ("EP-001" manufactured by Rigaku Kogyosha, Japan).

[0140] The slipperiness at ITO film deposition was evaluated by observing the transparent plastic film when it was unrolled before conducting vacuum deposition or sputtering, as to whether the following troubles were raised or not: (1) the transparent plastic film was damaged when brought into contact with the rollers in the apparatus used; (2) the transparent plastic film meandered during running or winding and, as a result, the rolled transparent plastic film had an irregular edge face; and (3) the tension on the transparent plastic film could not be kept constant. "No good" in Table 1 means that the transparent plastic film was suffered from at least one of these troubles; and "good" means that the transparent plastic film was not suffered from these troubles at all.

[0141] The sharpness of image was evaluated by placing the transparent conductive film on the front surface of a liquid crystal display (LCD) with a 0.7-mm thick transparent glass plate interposed between them. In Table 1, the transparent conductive film that made the image on the liquid crystal display fuzzy was indicated by "no good"; and the transparent conductive film that did not make the image on the liquid crystal display fuzzy was indicated by "good".

TABLE 1

	Ex. 1	Ex. 2	Comp. Ex. 1	Comp. Ex. 2
Total light transmittance %	90.0	89.7	90.7	87.4
Haze value	5.9	6.1	1.2	8.1
Rz (μm)	0.37	0.37	0.34	1.01
Rmax (μm)	0.81	0.81	0.48	2.20
Distinctness of image	420	390	500	150
Anti-glaring property	12	12	11	27
Pencil hardness	2H	2H	2H	2H
Slipperiness at ITO film deposition	good	good	no good	good
Sharpness of image when visually observed	good	good	good	no good

What is claimed is:

1. A transparent conductive film comprising:

a transparent plastic film; and

a transparent conductive layer laminated to a surface of the transparent plastic film;

wherein the transparent conductive film, as a whole, has a haze value of 8 or less; and at least one of the two surfaces of the transparent plastic film, that is, the surface to which the transparent conductive layer is laminated and the other surface, is provided with fine irregularities having a maximum height (Rmax) of 0.5 to 2.0 μm .

2. The transparent conductive film according to claim 1, wherein the fine irregularities have a ten-point mean roughness (Rz) of 0.35 to 1.5 μm .

3. The transparent conductive film according to claim 1, wherein the fine irregularities are provided as the surface structure of the transparent plastic film.

4. The transparent conductive film according to claim 1, wherein the fine irregularities are provided as the surface structure of a transparent resin layer laminated to the surface of the transparent plastic film.

5. The transparent conductive film according to claim 1, further comprising a hard coat layer laminated to the surface of the transparent plastic film opposite to the surface to which the transparent conductive layer is laminated.

6. The transparent conductive film according to claim 5, wherein the fine irregularities are provided on the surface of the transparent plastic film to which the transparent conductive layer is laminated; and the other surface of the transparent plastic film to which the hard coat layer is laminated is made smooth so that an exposed surface of the hard coat layer can be a mirror surface.

7. A touch panel comprising:

a first sheet having an electrode layer, and

a second sheet having an electrode layer, arranged on the first sheet with a spacer interposed between the first and second sheets so that the two electrode layers can face each other with an extremely small gap between them;

wherein at least one of the first and second sheets is a transparent conductive film that comprises a transparent plastic film and a transparent conductive layer serving as the electrode layer, laminated to a surface of the transparent plastic film, the transparent conductive